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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/627,155	07/24/2003	Satyadev R. Patel	P102-US	2516
7590 Gregory R. Muir 350 Potrero Avenue Sunnyvale, CA 94085			EXAMINER SMOOT, STEPHEN W	
			ART UNIT 2813	PAPER NUMBER

DATE MAILED: 06/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

**Office Action Summary**

Application No.

10/627,155

Applicant(s)

PATEL ET AL.

Examiner

Stephen W. Smoot

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 July 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-187 is/are pending in the application.
- 4a) Of the above claim(s) 1-47 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 183-187 is/are allowed.
- 6) ☒ Claim(s) 48-52, 56-62, 68, 82, 84-87, 90-110, 112, 116, 123, 124, 126-132, 138, 139 and 176-182 is/are rejected.
- 7) ☒ Claim(s) 53-55, 63-67, 69-81, 83, 88, 89, 111, 113-115, 117-122, 125, 133-137 and 140-175 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 4-26-04; 5-26-04; 6-18-04;
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: List of Related Applications dated 11-29-04

## **DETAILED ACTION**

This Office action is in response to application papers filed on 24 July 2003 and to applicant's preliminary amendment filed on 30 August 2004.

### ***Election/Restrictions***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-47 are drawn to a method of forming an array of mirror plates, classified in class 438, subclass 52.
  - II. Claims 48-187 are drawn to a spatial light modulator, classified in class 257, subclass 436.
2. The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another

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and materially different process such as a process that does not use sacrificial material to define the as claimed spacing between the hinge and the mirror plate.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Gregory R. Muir on 14 June 2005 a provisional election was made with traverse to prosecute the invention of Group II, claims 48-187. Affirmation of this election must be made by applicant in replying to this Office action. Claims 1-47 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

***Information Disclosure Statement***

6. Regarding the IDS received on 26 April 2004, the lined through documents have not been considered because copies of the references are not in the file of record;

Regarding the IDS received on 29 November 2004, the lined through documents correspond to duplicate entries that have been considered as indicated in other IDSs;  
and

Regarding the IDS received on 18 February 2005, the lined through document has not been considered because US 6,724,518 was withdrawn from issue and, accordingly, is not available.

***Specification***

7. The disclosure is objected to because of the following informality:

Update the first sentence of the specification (see preliminary amendment, page 2) to indicate that 10/613,379 has issued as US 6,873,450.

Appropriate correction is required.

8. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is

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requested in correcting any errors of which applicant may become aware in the specification.

### ***Claim Objections***

9. Claims 48-182 are objected to because of the following informalities:

In claim 48, line 9, change "has" to --have-- to correct grammar;

Claims 49-83 are objected to because they depend on claim 48;

In claim 53, line 1, change "device" to --devices-- to correct grammar;

In claim 54, line 1, change "device" to --devices-- to correct grammar;

In claim 55, line 1, change "device" to --devices-- to correct grammar;

In claim 82, line 2, change "he" to --the-- to correct spelling;

In claim 83, line 2, change "he" to --the-- to correct spelling;

In claim 89, line 1, change the claim dependency from "claim 98" to --claim 88--

because the claim appears to be narrowing the scope of claim 88;

In claim 97, line 1, change "has" to --have-- to correct grammar;

In claim 98, line 1, change "has" to --have-- to correct grammar;

In claim 99, line 1, change "has" to --have-- to correct grammar;

In claim 100, line 1, change "has" to --have-- to correct grammar;

In claim 104, line 5, change "has" to --have-- to correct grammar;

In claim 133, line 12, change "has" to --have-- to correct grammar;

Claims 134-137, 140-175 are objected to because they depend on claim 133;

In claim 167, line 2, delete the first appearance of "to" to correct grammar;  
In claim 169, line 2, delete the first appearance of "to" to correct grammar;  
In claim 171, line 1, change the claim dependency from "claim 168" to --claim 170-- because the claim appears to be intended to further limit claim 170;  
In claim 171, line 2, delete the first appearance of "to" to correct grammar;  
In claim 173, line 2, delete the first appearance of "to" to correct grammar; and  
In claim 175, line 2, delete the first appearance of "to" to correct grammar.  
Appropriate correction is required.

10. Claim 62 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim, or amend the claim to place the claim in proper dependent form, or rewrite the claim in independent form. In claim 62, the center-to-center distance can be less than 4.3 micrometers (i.e. it can be as little as 3.6 micrometers), which is outside of the scope of claim 48 because claim 48 has an as-claimed minimum of 4.3 micrometers.

11. Claims 172-173 are objected to under 37 CFR 1.75 as being substantial duplicates of claims 170-171. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

***Claim Rejections - 35 USC § 112***

12. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

13. Claims 90-92, 123-124, 126-132, 138-139 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 90 recites the limitation "the hinge" in line 1;

Claim 123 recites the limitation "the hinge" in lines 1-2;

Claim 129 recites the limitation "the hinge" in lines 1-2;

Claim 131 recites the limitation "the hinge" in lines 1-2;

Claim 138 recites the limitation "the array of mirror plates" in line 1; and

Claim 139 recites the limitation "the array of mirror plates" in line 1.

There is insufficient antecedent basis for these limitations in claims 90, 123, 129, 131, 138-139. However, it is noted that claim 133 does have antecedence for an array of mirror plates and the rejection of claims 138-139 could be overcome by amending claims 138-139 to depend on claim 133.

Claims 91-92, 126-128 are rejected under 35 U.S.C. 112, second paragraph, because they depend on claim 90;



Claim 124 is rejected under 35 U.S.C. 112, second paragraph, because it depends on claim 123;

Claim 130 is rejected under 35 U.S.C. 112, second paragraph, because it depends on claim 129; and

Claim 132 is rejected under 35 U.S.C. 112, second paragraph, because it depends on claim 131.

### ***Double Patenting***

14. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

15. Claims 48-52, 56-62, 68, 82, 84, 93-105, 110 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 220, 232 of copending Application No. 10/627,302. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 84, 97-104, 110 are within the scope of claim 220 of 10/627,302 and claims 48, 56-62,

68, 82, 84, 97-105, 110 are within the scope of claim 232 of 10/627,302. Regarding claims 49-52, 93-96, the number of mirror devices along a length of the array would have been obvious to a person of ordinary skill in the art at the time the invention was made, since it has been held that mere duplication of parts has no patentable significance unless a new and unexpected result is produced [*In re Harza* 274 F.2d 669, 124 USPQ 378 (CCPA 1960)].

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Claim Rejections - 35 USC § 102***

16. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

17. Claims 84-87, 93-96, 101-104, 106-109, 112, 116, 176-180 are rejected under 35 U.S.C. 102(b) as being anticipated by Ilkov et al. (US 2002/0024641 A1 – from applicant's IDS received on 2-18-05).

Referring to paragraphs [0034] to [0042], Ilkov et al. disclose a micromirror array with a pixel pitch that can range from 5 to 24  $\mu\text{m}$ . These are all of the limitations set forth in claims 84, 101-104 of the applicant's invention.

Regarding claim 176, the micromirror array can be combined with a light source to project images to a target (see paragraph [0053]).

Regarding claims 85-87, the micromirror array can be 14.336 mm by 10.752 mm (see paragraph [0041]), which correspond to a diagonal of about 18 mm or about 0.7 inches.

Regarding claims 93-96, 177-180, the micromirror array can be a QXGA (2048 x 1536 pixels).

Regarding claims 106-109, 112, 116, a light transmitting substrate with an optional blocking layer (i.e. anti-reflecting layer) and with an array of electrodes that correspond to the micromirrors is used to electrostatically control the micromirrors (see paragraphs [0023] and [0034]). A silicon wafer can be used when the light to be modulated is IR light (see paragraph [0023]).

### ***Claim Rejections - 35 USC § 103***

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

19. Claims 181-182 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ilkov et al. (US 2002/0024641 A1 – from applicant's IDS received on 2-18-05) as applied to claim 176 above, and further in view of Quate et al. (US 6,271,957 B1).

As shown above, Ilkov et al. (US 2002/0024641 A1) anticipate claim 176 of the applicant's invention. However, Ilkov et al. (US 2002/0024641 A1) lack the further limitations to claim 176 as set forth in claims 181-182, which are to use as the light source an arc lamp with an arc length of less than 1.0 mm (claim 181) or less than 0.7 mm (claim 182). Quate et al. teach that an arc lamp can be used as the light source for driving a micromirror array at wavelengths ranging from 400 to 410 nm (see column 4, lines 36-60).

Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Ilkov et al. (US 2002/0024641 A1) and Quate et al. in order to use an arc lamp, as taught by Quate et al., to drive the micromirror array of Ilkov et al. (US 2002/0024641 A1). Quate et al. recognize that using an arc lamp as the light source has the advantage of increased brightness (see column 4, lines 48-51).

#### ***Allowable Subject Matter***

20. Claims 48-83 would be allowable if rewritten or amended to overcome the objections set forth in this Office action and if a timely filed terminal disclaimer in

compliance with 37 CFR 1.321(c) is used to overcome the provisional nonstatutory double patenting rejection.

21. Claims 133-137, 140-175 would be allowable if rewritten or amended to overcome the objections set forth in this Office action.

22. Claims 88-89, 111, 113-115, 117-122, 125 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims, and if claim 89 was rewritten or amended to overcome the objection set forth in this Office action.

23. Claims 183-187 are allowed.

24. The following is a statement of reasons for the indication of allowable subject matter:

- Claims 48-83, 133-137, 140-175 would be allowable and claims 183-187 are allowed because the prior art of record does not teach or suggest, in combination with the other claim limitations, a spatial light modulator that includes an array of mirror devices, wherein each mirror device has a mirror plate attached to a hinge such that the mirror plate and the hinge are spaced apart from 0.5 to 1.5 micrometers, and wherein adjacent mirror plates have a center-to-center distance from 4.3 to 10.16 micrometers;

- Claims 88-89 would be allowable because the prior art of record does not teach or suggest, in combination with the other claim limitations, a spatial light modulator that includes an array of mirror devices, wherein each mirror device has a mirror plate attached to a hinge such that the mirror plate and the hinge are spaced apart from 0.1 to 0.45 micrometers, and wherein adjacent mirror plates have a center-to-center distance from 4.3 to 10.16 micrometers;
- Claim 111 would be allowable because the prior art of record does not teach or suggest, in combination with the other claim limitations, a spatial light modulator that includes an array of movable mirror plates, wherein adjacent mirror plates have a center-to-center distance from 4.38 to 10.16 micrometers combined with an illumination efficiency that is 90 % or more;
- Claims 113-115 would be allowable because the prior art of record does not teach or suggest, in combination with the other claim limitations, a spatial light modulator that includes an array of movable mirror plates, wherein adjacent mirror plates have a center-to-center distance from 4.38 to 10.16 micrometers, combined with two electrodes for rotating the mirror plate in opposite directions;
- Claims 117-122 would be allowable because the prior art of record does not teach or suggest, in combination with the other claim limitations, a spatial light modulator that includes an array of movable mirror plates, wherein adjacent mirror plates have a center-to-center distance from 4.38 to 10.16 micrometers, combined with the mirror plate being attached to a hinge for rotating in a first direction at an angle from 15 to 27 degrees relative to the substrate; and

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- Claim 125 would be allowable because the prior art of record does not teach or suggest, in combination with the other claim limitations, a spatial light modulator that includes an array of movable mirror plates, wherein adjacent mirror plates have a center-to-center distance from 4.38 to 10.16 micrometers, and wherein a gap between adjacent mirror plates is from 0.1 to 0.5 micrometers.

### ***Conclusion***

25. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lin et al. and Pan teach spatial light modulator structures.

26. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen W. Smoot whose telephone number is 571-272-1698. The examiner can normally be reached on M-F (8:00 am to 4:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SWS

*Stephen W. Smoot*  
Patent Examiner  
Art Unit 2813